

CLAIMS

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1. A composite structure comprising:

a first metal pad structure comprising a first interconnect metal;

a first via pad structure below said first metal pad structure, said first via pad

5 structure comprising a first via metal, said first via metal contacting said first interconnect metal;

a second metal pad structure below said first via pad structure, said second metal pad structure comprising a first plurality of segments of a second interconnect metal and a first plurality of dielectric fillers, at least one of said first plurality of segments of said second interconnect metal contacting said first via metal.

2. The composite structure of claim 1 wherein said first metal pad structure is a bonding pad.

15 3. The composite structure of claim 1 wherein said first metal pad structure has a first geometry, said first geometry having a first plurality of dimensions, said first via pad structure having said first geometry and said first plurality of dimensions.

20 4. The composite structure of claim 1 wherein each one of said first plurality of dielectric fillers is placed between two of said first plurality of segments of said second interconnect metal.

5. The composite structure of claim 1 wherein said first interconnect metal is selected from the group consisting of copper and aluminum.

6. The composite structure of claim 1 wherein said first via metal is selected
5 from the group consisting of copper and tungsten.

7. The composite structure of claim 1 wherein said second interconnect metal is selected from the group consisting of copper and aluminum.

8. A composite structure comprising:
a first metal pad structure comprising a first interconnect metal;
a first via pad structure below said first metal pad structure, said first via pad structure comprising a first via metal, said first via pad structure contacting said first metal pad structure;
10 a second metal pad structure below said first via pad structure, said second metal pad structure comprising a first plurality of segments of a second interconnect metal and a first plurality of dielectric fillers, at least one of said first plurality of segments of said second interconnect metal contacting said first via pad structure;
15 a second via pad structure below said second metal pad structure, said second via pad structure comprising a first plurality of segments of a second via metal and a second plurality of dielectric fillers, at least one of said first plurality of segments of said second via metal contacting at least one of said first plurality of segments of said second

~~interconnect metal;~~

a third metal pad structure below said second via pad structure, said third metal pad structure comprising a first plurality of segments of a third interconnect metal and a third plurality of dielectric fillers, at least one of said first plurality of segments of said third interconnect metal contacting at least one of said first plurality of segments of said second via metal.

9. The composite structure of claim 8 wherein said first metal pad structure is a bonding pad.

10. The composite structure of claim 8 wherein said first metal pad structure has a first geometry, said first geometry having a first plurality of dimensions, said first via pad structure having said first geometry and said first plurality of dimensions.

11. The composite structure of claim 8 wherein each one of said first plurality of dielectric fillers is placed between two of said first plurality of segments of said second interconnect metal.

12. The composite structure of claim 8 wherein each one of said second plurality of dielectric fillers is placed between two of said first plurality of segments of said second via metal.

13. The composite structure of claim 8 wherein each one of said third plurality of dielectric fillers is placed between two of said first plurality of segments of said third interconnect metal.

5 14. The composite structure of claim 8 wherein said first interconnect metal is selected from the group consisting of copper and aluminum.

15. The composite structure of claim 8 wherein said second interconnect metal is selected from the group consisting of copper and aluminum.

16. The composite structure of claim 8 wherein said third interconnect metal is selected from the group consisting of copper and aluminum.

17. The composite structure of claim 8 wherein said first via metal is selected
15 from the group consisting of copper and tungsten.

18. The composite structure of claim 8 wherein said second via metal is selected from the group consisting of copper and tungsten.

20 19. A method for fabricating a composite structure in an integrated circuit chip, the method comprising the steps of:

fabricating a first metal pad structure, said first metal pad structure comprising a

first plurality of segments of a first interconnect metal and a first plurality of dielectric fillers;

5 fabricating a first via pad structure above said first metal pad structure, said first via pad structure comprising a first via metal, said first via metal contacting at least one of said first plurality of segments of said first interconnect metal;

fabricating a second metal pad structure above said first via pad structure, said second metal pad structure comprising a second interconnect metal, said second interconnect metal contacting said first via metal.

20. The method of 19 wherein said second metal pad structure is a bonding pad.

21. The method of claim 19 wherein said second metal pad structure has a first geometry, said first geometry having a first plurality of dimensions, said first via pad structure having said first geometry and said first plurality of dimensions.

15 22. The method of claim 19 wherein each one of said first plurality of dielectric fillers is placed between two of said first plurality of segments of said first interconnect metal.

20 23. The method of claim 19 wherein said first interconnect metal is selected from the group consisting of copper and aluminum.

24. The method of claim 19 wherein said first via metal is selected from the group consisting of copper and tungsten.

25. The method of claim 19 wherein said second interconnect metal is selected from the group consisting of copper and aluminum.

26. A method for fabricating a composite structure in an integrated circuit chip, the method comprising the steps of:

fabricating a first metal pad structure, said first metal pad structure comprising a first plurality of segments of a first interconnect metal and a first plurality of dielectric fillers;

concurrently fabricating a first via pad structure and a second metal pad structure, said first via pad structure being above said first metal pad structure, said first via pad structure comprising a first via metal, said first via metal contacting at least one of said first plurality of segments of said first interconnect metal, said second metal pad structure being above said first via pad structure, said second metal pad structure comprising a second interconnect metal, said second interconnect metal contacting said first via metal.

27. The method of 26 wherein said second metal pad structure is a bonding pad.

28. The method of claim 26 wherein said second metal pad structure has a first geometry, said first geometry having a first plurality of dimensions, said first via pad

structure having said first geometry and said first plurality of dimensions.

29. The method of claim 26 wherein each one of said first plurality of dielectric
fillers is placed between two of said first plurality of segments of said first interconnect
5 metal.

30. The method of claim 26 wherein said first interconnect metal is selected
from the group consisting of copper and aluminum.

31. The method of claim 26 wherein said first via metal is selected from the
group consisting of copper, aluminum, and tungsten.

32. The method of claim 26 wherein said second interconnect metal is selected
from the group consisting of copper, aluminum, and tungsten.

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